

WHAT IS CLAIMED IS:

1. A printer, to which a cartridge is detachably attached, said cartridge keeping ink therein and having a rewritable non-volatile memory, wherein the ink kept in said cartridge is transferred to a printing medium, so as to implement printing, said printer comprising:

a memory writing unit that writes plural pieces of information relating to said cartridge into said rewritable non-volatile memory of said cartridge at a preset timing and thereby at a certain frequency;

a rewritable storage device incorporated in said printer main body of said printer; and

an information writing unit that writes specific information into said rewritable storage device of said printer main body at a specified frequency that is higher than the certain frequency, at which the plural pieces of information relating to said cartridge are written into said non-volatile memory of said cartridge, the specific information being identical with at least part of the plural pieces of information relating to said cartridge.

2. A printer in accordance with claim 1, wherein said information writing unit writes the specific information into said rewritable storage device of said printer main body at the preset timing as well as at another timing.

3. A printer in accordance with claim 1, wherein said memory writing unit writes the plural pieces of information into said rewritable non-volatile memory of said cartridge at a power-off

time of said printer and/or at a time of replacement of said cartridge.

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5 4. A printer in accordance with any one of claims 1 through 5, wherein said information writing unit writes the specific information into said rewritable storage device on completion of printing with regard to one page.

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10 5. A printer in accordance with any one of claims 1 through 5, wherein said information writing unit writes the specific information into said rewritable storage device on completion of printing with regard to at least one raster line.

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7 6. A printer in accordance with any one of claims 1 through 6, said printer further comprising:

a print head that is mounted on a printer main body of said printer; and

15 a cleaning unit that is activated in response to a predetermined operation, so as to carry out a head cleaning process, which causes said print head to eject a predetermined quantity of ink,

wherein said information writing unit writes the specific information into said rewritable storage device at a timing when said cleaning unit is activated.

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7. A printer in accordance with claim 1, wherein said non-volatile memory transmits data by serial access, and

said memory writing unit writes the plural pieces of information into said non-volatile memory of said cartridge in synchronism with a clock for specifying an address.

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8. A printer in accordance with claim 1, wherein said rewritable storage device of said printer main body is a non-volatile memory that holds contents of storage even after a power-off operation of said printer.

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9. A printer in accordance with claim 1, wherein a writing rate of said rewritable storage device of said printer main body is higher than a writing rate of said rewritable non-volatile memory of said cartridge.

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10. A printer in accordance with claim 9, wherein said rewritable storage device of said printer main body is either a DRAM or an SRAM.

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10. A printer in accordance with either one of claims 9 and 10, wherein said rewritable storage device of said printer main body is disposed in a control IC, which directly controls the writing operation of the plural pieces of information into said non-volatile memory of said cartridge.

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12. A printer in accordance with either one of claims 1 and 2, said printer further comprising:

20 a print head that is mounted on a printer main body of said printer,

wherein said cartridge is detachably attached to a carriage, on which said print head is mounted and which moves forward and backward relative to said printing medium, and

said storage device of said printer main body is disposed on said carriage.

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13. A printer in accordance with claim 11, said printer

further comprising:

a print head that is mounted on a printer main body of said printer,

5 wherein said cartridge is detachably attached to a carriage, on which said print head is mounted and which moves forward and backward relative to said printing medium,

said control IC is disposed on said carriage, and

10 said control IC on said carriage transfers data to be written into said non-volatile memory from said printer main body to said cartridge via a cable connecting with said carriage.

14. A printer in accordance with claim 1, wherein

both a black ink cartridge that keeps black ink and a color ink cartridge that keeps a plurality of different color inks are detachably attached to said printer as said cartridge, and

15 said memory writing unit writes the plural pieces of information into non-volatile memories, which are respectively provided in said black ink cartridge and said color ink cartridge.

20 15. A printer in accordance with claim 1, wherein said memory writing unit writes the plural pieces of information into said non-volatile memory of said cartridge, before said information writing unit writes the specific information into said rewritable storage device of said printer main body.

25 16. A printer in accordance with claim 1, wherein said memory writing unit writes the plural pieces of information into said non-volatile memory of said cartridge, after the writing operation of said information writing unit into said rewritable storage

device of said printer main body is completed.

17. A printer in accordance with claim 1, said printer further comprising:

an identification unit that determines whether or not
5 contents of storage in said non-volatile memory of said cartridge
are coincident with contents of storage in said rewritable storage
device of said printer main body at a time of power supply to said
printer and/or at a time of initiating a replacement of said
cartridge; and

10 a reconciliation unit that reconciles the contents of
storage in one of said non-volatile memory and said rewritable
storage device with the contents of storage in the other of said
non-volatile memory and said rewritable storage device, in the case
where said identification unit determines that the contents of
15 storage in said non-volatile memory are not coincident with the
contents of storage in said rewritable storage device.

18. A method of managing information in a printer, to which
a cartridge is detachably attached, said cartridge keeping ink
therein and having a rewritable non-volatile memory, wherein the
20 ink kept in said cartridge is transferred to a printing medium,
so as to implement printing, said method comprising the steps of:

writing plural pieces of information relating to said
cartridge into said rewritable non-volatile memory of said
cartridge at a preset timing and thereby at a certain frequency;
25 and

writing specific information into a rewritable storage

device incorporated in said printer main body of said printer at a specified frequency that is higher than the certain frequency, at which the plural pieces of information relating to said cartridge are written into said non-volatile memory of said cartridge, the
5 specific information being identical with at least part of the plural pieces of information relating to said cartridge.

19. A cartridge keeping ink therein and having a rewritable non-volatile memory, said cartridge being detachably attached to a printer,

10 wherein information relating to said cartridge is written into said non-volatile memory of said cartridge at a certain frequency that is lower than a specified frequency, at which the information relating to said cartridge is written into a storage device incorporated in a printer main body of said printer.

15 20. A cartridge in accordance with claim 19, wherein the information relating to said cartridge is written into said non-volatile memory of said cartridge at a power-off time of said printer and/or at a time of replacement of said cartridge.

20 21. A cartridge in accordance with claim 19, wherein said non-volatile memory transmits data by serial access, and the writing operation of the information relating to said cartridge into said non-volatile memory is carried out synchronously with a clock for specifying an address.

25 22. A cartridge in accordance with claim 19, wherein the information relating to said cartridge is written into said non-volatile memory of said cartridge, before the information is

written into said storage device of said printer main body.

23. A cartridge in accordance with claim 19, wherein the information relating to said cartridge is written into said non-volatile memory of said cartridge, after the writing operation
5 of the information into said storage device of said printer main body is completed.

24. A cartridge in accordance with claim 19, said cartridge comprising:

an ink reservoir, in which a plurality of different inks are
10 kept,

wherein plural pieces of information with regard to the plurality of different inks are written into said non-volatile memory of said cartridge.

25. A cartridge in accordance with claim 24, wherein said
15 ink reservoir is parted into at least three ink chambers, in which at least three different inks are kept,

wherein said non-volatile memory comprises a plurality of information storage areas, in which plural pieces of information regarding quantities of the at least three different inks are stored
20 respectively and independently, and

a storage capacity of at least one byte is allocated to each of the plurality of information storage areas.

26. A cartridge in accordance with claim 24, wherein said
ink reservoir is parted into at least five ink chambers, in which
25 at least five different inks are kept,

wherein said non-volatile memory comprises a plurality of

information storage areas, in which plural pieces of information regarding quantities of the at least five different inks are stored respectively and independently, and

a storage capacity of at least one byte is allocated to each
5 of the plurality of information storage areas.

27. A cartridge in accordance with claim 26, wherein the at least five different inks comprise three deep color inks and two light color inks, which correspond to two deep colors among the three deep color inks,

10 the information storage areas for storing pieces of information regarding the three deep color inks being located in a first area that is written first by said printer, and the information storage areas for storing pieces of information regarding the two light color inks being located in a second area
15 that is written next by said printer.

28. A cartridge in accordance with claim 27, wherein the three deep color inks are cyan, magenta, and yellow, and the two light color inks are light cyan and light magenta.

29. A cartridge in accordance with claim 24, wherein said
20 non-volatile memory has a specific writing area, in which the plural pieces of information are written, on one end of a memory space thereof.

30. A cartridge in accordance with claim 19, wherein said non-volatile memory is an EEPROM.